

T_m = temperatura média do fluido refrigerante

$$\text{de calor convertido} = (mT - cD + \frac{1}{2}P^2R - n) = \frac{1}{2}P^2R$$

$$0 = k_f \frac{d^2 T}{dx^2} + q'''$$

$$\frac{dT}{dx} = -\frac{q'''}{k_f} + C_1 \quad \text{para } x=0: \frac{dT}{dx} = 0; C_1 = 0$$

$$\frac{d^2 T}{dx^2} = -\frac{q'''}{K_f}$$

$$T = \frac{-g'' x^2}{2k_c} + C_2 \quad \text{para } x = a: -k_c \frac{dT}{dx} = h(T - T_m)$$

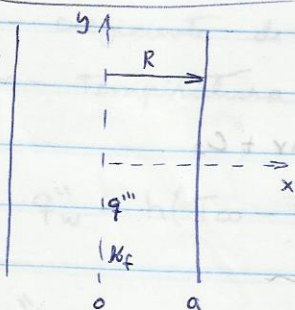
$$\text{assim: } -k_f \frac{dT}{dx} = h \left(-\frac{q'' a^2}{2k_c} + C_2 - T_m \right)$$

$$-k_f \frac{dT}{dx} = -V_f (-q''_m x) = q''_m x$$

$$q'''a = h \left(\frac{-q'''a^2}{2k_f} + C_2 - T_m \right)$$

$$C_2 = T_m + \frac{q'''a}{h} + \frac{q'''a^2}{2k_f} \quad ; \quad T(x) = -\frac{q'''x^2}{2k_f} + \frac{q'''a^2}{2k_f} + \frac{q'''a}{h} + T_m$$

$$T(x) = \frac{q''' a^2}{2k_f} \left(1 - \left(\frac{x}{a} \right)^2 \right) + \frac{q''' a}{h} + T_m \quad \left| \quad T_{m\max} \text{ quando } x \rightarrow 0 \right.$$



$$0 = \frac{k_f}{r} \frac{d}{dr} \left(r \frac{dT}{dr} \right) + q'''$$

$$-K_f \frac{dT}{dr} = h(T - T_m)$$

$$\frac{d}{dr} \left(r \frac{dT}{dr} \right) = - \frac{r q''' }{k_f}$$

$$T = - \frac{r^2 q'''}{4k_f} + C_1 \ln r + C_2$$

$$r \frac{dT}{dr} = - \frac{r^2 q''''}{2k_f} + \frac{C_1}{r}$$

$$\frac{dT}{dr} = \frac{-r q'''}{2k_f} \Rightarrow T = -\frac{r^2 q'''}{4k_f} + C_2$$